

ABSTRACT

The invention provides a non-cyclic, meso-frequency traveling wave electro-kinetic system capable of use in purification/separation and/or refrigeration/heat pump processes. In particular, the invention provides an adsorption system that can be used for fine or bulk chemical separations of liquid and gaseous materials. Similarly, the adsorption system can be readily adapted to function as a refrigeration/heat pump unit for use in heating and cooling systems. This reusable adsorption system provides high efficiency purification and/or cooling/heating with low energy demands and no moving parts. The invention can function in parallel or in series with other similar such adsorption units (though it can also operate as a single unit).